

ORIGINAL ARTICLE**AN ANALYSIS OF COMPULSORY TRAFFIC VEHICLE INSURANCE SYSTEMS IN TURKEY AND EUROPEAN COUNTRIES AND A MODEL PROPOSAL ***

Akbermet KUBATBEKOVA

Özgür AKPINAR

Authors Notes:**Correspondence**

Marmara University Institute of Banking and Insurance, Department of Insurance, Istanbul, Turkey,
ORCID: 0009-0004-5699-3272,
bermetkubatbekovna@gmail.com

Prof. Dr., Marmara University, Faculty of Financial Sciences, Department of Insurance, Istanbul, Turkey,
ORCID: 0000-0003-2084-2662,
oakpinar@marmara.edu.tr

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Abstract

This study examines the compulsory traffic vehicle insurance systems in Türkiye and selected European countries such as Germany, France, Italy, the Netherlands, and Poland. The research focuses on the history, legal framework, premium calculation methods, bonus-malus systems, supervision, and current structure of compulsory traffic insurance in these countries. Statistical data for each country were collected from official insurance institutions and guarantee fund reports, and the findings were analyzed through a comparative approach. First, the current situation of compulsory traffic insurance in Türkiye was examined. The high rate of uninsured vehicles, high loss ratio, unprofitable market, and problems in the pricing process were identified as the main issues. Later, the systems in European countries were studied, showing that wider insurance coverage, financial sustainability, risk-based pricing, and technological innovations (such as black boxes and usage-based insurance) are common practices. Based on these examples, a model proposal for Türkiye was developed to improve the structure and efficiency of the system. The aim of the study is to suggest ways to make Turkey's compulsory traffic insurance system more effective and to contribute to academic research in this field.

Keywords

Compulsory traffic Insurance, Bonus-malus System, Comparative Analysis, Uninsured Vehicles

JEL Classification

G20, G22, L10, L50.

1. INTRODUCTION

The number of traffic vehicles worldwide has increased significantly in recent years. The main reasons for this trend include economic growth, the development of transportation infrastructure, and increased demand for individual mobility. In Turkey, the number of cars, which was approximately 28 million in 2023, rose to 32 million in 2024, representing an increase of approximately 14% (Turkish Statistical Institute [TUIK], 2024). Similarly, vehicle ownership rates are increasing worldwide. This rapid increase in the number of vehicles has many problems. The increase in the number of traffic accidents is at the forefront of these problems. The rise in accidents causes damage to both vehicles and people.

In this context, the importance of compulsory traffic insurance is increasing day by day. Compulsory traffic insurance is a type of insurance mandated by the state that guarantees compensation for material and bodily harm that vehicle owners may cause to third parties while using their vehicles. This insurance protects individuals against potential financial losses while also contributing to the maintenance of traffic order, public safety, and public order (Goliadze, 2023, p.2).

It is a legal obligation for every traffic vehicle to be insured with this insurance, which is mandatory by the state. Compulsory traffic insurance covers compensation for bodily injury, permanent disability, and loss of support, as well as material damage suffered by third parties in the event of an accident (Temur, 2018, p.309).

This study examines the compulsory traffic insurance system by comparing its implementation in Turkey with that in European countries. Most studies conducted in the literature to date have addressed the compulsory traffic insurance systems of Turkey and certain European countries only within the framework of specific criteria. For example, the activities of Guarantee Funds in European countries and Turkey have been compared; according to these studies, Guarantee Funds in Europe carry out various preventive activities, such as projects analyzing the causes of traffic accidents, in addition to compensation payments. For example, while projects analyzing the causes of accidents are implemented in Spain, it has been stated that studies in this area are limited in Turkey (Eren, 2010). Furthermore, previous studies have highlighted structural problems in Turkey's compulsory traffic insurance system, such as the high rate of uninsured vehicles, fraudulent damage claims, and premiums not being determined based on damage costs (Öztürk, 2008, p.68).

This study, however, goes beyond specific criteria and examines the compulsory traffic insurance systems in Turkey, Germany, Italy, Poland, France, and the Netherlands in a multidimensional manner. The analysis comparatively evaluates various elements such as each country's legal regulations on compulsory traffic insurance, premium determination systems, rates of uninsured drivers, and methods of combating uninsured driving. The results of the research identified the strengths and weaknesses of each country's system, including the current problems in Turkey. Furthermore, a model proposal for Turkey was developed by drawing on successful practices in European countries.

This study consists of seven sections. First, a literature review is conducted, followed by an explanation of the research methodology and data sources. Subsequently, the compulsory traffic insurance system in Turkey is examined, followed by a review of the systems in European countries. After these reviews, a comparative analysis is performed, and the final section presents the conclusions, evaluations, and recommendations.

2. LITERATURE

Eren (2010) conducted a comparative analysis of Guarantee Funds in Turkey and European countries. According to this study, a large portion of the fund's expenditures in Turkey is allocated to covering damages caused by uninsured vehicles, indicating that the number of uninsured vehicles in the country is high. In contrast, guarantee funds in European countries combat uninsured driving and carry

out activities to prevent traffic accidents. The study concluded that similar practices should be implemented in Turkey.

Goliadze (2019) conducted a comparative analysis of compulsory traffic insurance systems in Turkey, Europe, and Asia. According to the study, European countries have long-established, robust legal frameworks for compulsory traffic insurance and employ a risk-based pricing method. It was concluded that this system serves as a model for underdeveloped or developing countries.

Browne, Chung, and Frees (2000) conducted a study on liability insurance, particularly mandatory insurance practices, among OECD countries. The researchers conducted a comparative analysis of insurance premiums and insurance penetration levels in these countries. The study found that the rates in Turkey were below those of other countries, particularly below the average for European countries.

Porrini, Fusco, and Magazzino (2020) examined Italy's compulsory traffic insurance system between 2014 and 2017. The study focused particularly on the use of black box technology in determining premiums. The researchers found that black box applications enabled insurance companies to obtain more detailed and accurate information about the risk profile of policyholders, which contributed to premiums being set in a more fair and realistic manner.

Öztürk (2008) examined the traffic vehicle insurance sector in European countries and Turkey. The research found that although traffic vehicle insurance accounts for more than half of total premium production in Turkey, it is a loss-making sector within the year. The study listed the reasons for this situation as including an increase in damage costs, ineffective use of no-claims discounts, and similar factors. It also determined that similar problems were seen in European countries, but that these countries had solved or minimized most of the problems in question.

Peleckienė (2018) addressed the problems experienced in the compulsory traffic insurance system in European Union member states. According to the researcher, some insurance companies avoid providing insurance by offering high premiums, which leads to an increase in the rate of uninsured drivers in certain countries. She also emphasized that some regulations and improvements are needed in European Union directives to resolve these issues.

Gönülal (2009) examined compulsory traffic insurance systems in developing countries. According to the researcher, the implementation of the TRAMER system in Turkey has partially resolved certain issues such as uninsured drivers and fake insurance policies. However, Gönülal noted that various problems still persist in the country and emphasized that a more effective pricing system and strengthened oversight mechanisms are needed to address these issues.

Scalera and Zazzaro (2004) examined traffic vehicle insurance systems in European countries, classifying them according to the periods in which liberalization occurred in the insurance market. According to the research findings, some countries experienced a rapid price liberalization process in insurance premiums. The researchers stated that liberalization should be implemented in a controlled manner; otherwise, liberalization policies carried out without the necessary oversight and control mechanisms could lead to premium increases.

Engin and Karakuş (2020) examined the insurance sectors of European countries and Turkey using a comparative analysis method. According to the researchers, the Turkish insurance market is an attractive market for foreign insurance companies due to its high potential, and there are a large number of companies operating in the sector. Furthermore, it was noted that the state's requirement for certain types of insurance has led to these branches occupying a significant place in the total market share. However, the researchers emphasized that insurance is essentially a sector that should develop based on individuals' preferences and on a voluntary basis.

Karaoğlu (2007) analyzed the insurance sector in Turkey and European countries using ANOVA and Kruskal-Wallis tests. According to the researcher, the insurance penetration rate in Turkey remains low compared to European countries. However, Karaoğlu stated that Turkey has high potential in terms of the insurance sector and emphasized that insurance awareness must be increased in order to effectively evaluate this potential.

Kwieceń and Poprawska (2011) evaluated Poland's compulsory traffic insurance system in com-

parison with developments in Europe. The study examined the effects of increasing compensation claims, road safety levels, frequency of damage, premium rates, and changes in legal regulations on the insurance sector. The findings revealed that following Poland's accession to the EU, it had largely aligned with European Union standards in terms of guarantee limits and compensation principles, but that premium rates remained below the Western European average.

Demirbilek (2007) examined liability insurance systems in European countries and Turkey. According to the researcher, the main reason why compulsory traffic insurance has the highest share among liability insurances in Turkey is that it is a legally compulsory type of insurance. In other words, individuals take out this insurance not by their own choice but because it is a legal requirement. It was also emphasized that insurance awareness in Turkey is not at the desired level.

3. METHOD

This research is based on the comparative analysis method. The study examines the legal framework, structural characteristics, premium determination mechanisms, operation of guarantee funds, and technical systems applied in compulsory traffic insurance systems in Turkey and some European countries. In this context, the study is descriptive in nature, analyzing the current status of the systems in the countries, revealing their similarities and differences, and aiming to develop a suitable model proposal for Turkey in light of the findings obtained from these examinations.

4. DATA SOURCES

The data used in this study has been compiled from primary and secondary sources. Primary sources include each country's national insurance legislation, legal regulations concerning guarantee funds, and official statistics and reports published by insurance supervisory authorities, such as UFG in Poland, FGAO in France, and BaFin in Germany. Secondary sources include reports and statistical data published by national and international organizations such as the OECD, the European Insurance and Occupational Pensions Authority (EIOPA), the European Commission, the Turkish Insurance Association (TSB), and the Insurance and Private Pension Regulation and Supervision Agency (SEDDK). Academic studies, master's theses, and sectoral publications related to the subject were also used to supplement the research data.

5. COMPULSORY TRAFFIC INSURANCE SYSTEM IN TURKEY

Compulsory traffic insurance in Turkey is regulated based on the Highway Traffic Law No. 2918. This law makes it a legal obligation for traffic vehicle operators to insure themselves and cover any damages they may cause to third parties (Petek, 2014, p.3287). The scope of this insurance is regulated in Article 2 of the General Conditions, which states that the insurance covers material damages and bodily injuries. Bodily injuries include disability, loss of support due to death, and medical expenses.

The coverage limits for damages falling under this scope are determined annually by the Insurance and Private Pension Regulation and Supervision Authority (SEDDK). The limits are updated taking into account the economic conditions and inflation rates of the relevant year and are binding for all insurance companies. The coverage amounts determined for 2024 are 300,000 TL per vehicle and 600,000 TL per accident for material damages. In terms of medical expenses, the coverage is 2.7 million TL per person and, depending on the type of vehicle, between 6 million TL and 31.5 million TL per accident. For compensation for loss of support due to disability or death, the limit is 2.7 million TL per person and between 6 million TL and 31.5 million TL per accident (Insurance and Private Pension Regulation and Supervision Authority [SEDDK], 2024).

In Turkey's compulsory traffic insurance, the premium determination system was changed in 2017 and maximum premiums were applied. Under this system, SEDDK determines the highest premium

amounts according to vehicle types, and insurance companies determine premiums on the condition that they do not exceed these amounts. This regulation is implemented to keep premium increases under control and ensure stability in the insurance system. In addition, an eight-tier bonus-malus system is used in Turkey, whereby discounts are applied to policyholders during accident-free periods, while premium increases (malus) are applied to vehicle owners who have frequent accidents (Baykal & Bülbül, 2016, p.21). The effective implementation of the bonus-malus system is made possible through TRAMER, which enables the central collection of insurance data. This system contains policy and claims history information for policyholders. In the premium determination process, insurance companies use this information to assess the policyholder's risk history. Additionally, a "High-Risk Insurance Pool" has been created for drivers in the high-risk group. This pool balances risk distribution by sharing high-risk policies among insurance companies (Umut, 2020, p.365).

Compulsory traffic insurance premiums in Turkey have followed a fluctuating trend. Looking at the change in premiums over the years, they have increased significantly in the last two periods. First, with the transition to a free tariff system in 2015, there was an excessive increase in premiums, which led to instability in the market. In 2017, the government imposed maximum premiums to curb price increases. In 2022, the country experienced a second major increase due to the deterioration of its macroeconomic situation, high inflation rates, and exchange rate fluctuations. One of the fundamental problems facing the compulsory traffic insurance system in Turkey is the high rate of uninsured vehicles. Although insurance is a legal requirement, the number of uninsured vehicles has been increasing every year. Indeed, while the rate of uninsured vehicles was approximately 20% in 2023, this rate rose to 22% in 2024 (Guarantee Account, 2024). This situation is considered one of the main structural problems negatively affecting the effectiveness of the system.

Table 1

Compulsory Traffic Insurance Data for Turkey Between 2020 and 2024

Years	Earned Premiums (Billion TL)	Claims Paid (Billion TL)	Claims Ratio (%)	Technical Profit/Loss (Billion TL)
2020	12.8	12	93.6	+0.8
2021	13	16.3	125.2	-2.8
2022	20	35.9	179.3	-11.7
2023	56.6	79.4	134.2	-13.8
2024	121.3	152.7	127	-17

Source: *Turkish Insurance Association (TSB), Financial Statements 2024, retrieved on December 18, 2024, from <https://www.tsb.org.tr/tr>.*

Table 1 shows Turkey's compulsory traffic insurance data for the years 2020–2024. According to these data, the compulsory traffic insurance branch only achieved a technical profit of approximately 0.8 billion TL in 2020. The main reason for this is the decrease in traffic density during the COVID-19 pandemic and, consequently, the decline in the frequency of accidents. In other years, the sector consistently incurred losses. The highest loss occurred in 2024, with the technical loss reaching 17 billion TL in that year. This amount represents an increase of approximately 23% compared to the previous year (Turkish Insurance Association [TSB], 2024).

6. COMPULSORY TRAFFIC INSURANCE SYSTEM IN EUROPEAN COUNTRIES

The compulsory traffic insurance system in European countries is regulated under the European Union's traffic Insurance Directives 72/166/EEC, 84/5/EEC, 2000/26/EC, and 2009/103/EC. These

directives aim to prevent uninsured vehicles, protect cross-border compensation rights, and ensure the free movement of vehicles. Each member state implements this framework by adapting it to its own national law, resulting in some structural differences in the operation of the system. The examples of Germany, France, Italy, the Netherlands, and Poland are examined below.

6.1. Compulsory traffic Insurance in Germany

Germany is one of the European countries with the longest history of compulsory traffic insurance. This system came into force in 1939 and is currently regulated by the German Compulsory traffic Insurance Act (Pflichtversicherungsgesetz – PflVG). Furthermore, the legal framework of the system is supported by the Road Traffic Act (Straßenverkehrsgesetz – StVG) and European Union traffic insurance directives. Compulsory traffic vehicle insurance in Germany covers compensation for material and bodily harm caused to third parties in the event of an accident (Fromm, 1961, p. 2).

In Germany, the mandatory traffic insurance system transitioned to a free pricing system in 1994. Since then, insurance companies have been granted the authority to independently determine premiums. When calculating premiums, various criteria based on risk assessment are taken into account. These include factors such as the driver's age, occupation, region of residence, vehicle type, traffic volume, and number of claim-free years (Gesamtverband der Deutschen Versicherungswirtschaft [GDV], 2025). In addition, insurance companies in Germany use the Bonus-Malus system when setting premiums. This system has a very detailed structure in the country and is applied through a multi-level classification called Schadenfreiheitsklasse (SF). The SF system consists of 54 levels, and drivers in the highest class can receive a premium discount of approximately 85% (Gyetvai, 2021). For new insurance policyholders, there are two different entry levels initially determined based on driving experience. This structure allows drivers to be assessed more fairly based on their risk history. The strongest aspect of the Bonus–Malus system in Germany is that the large number of levels allows risk groups to be separated more precisely.

Compulsory traffic insurance premiums in Germany generally follow a stable trend. While the average premium was €251 in 2023, it rose by approximately 9% to €273 in 2024 (GDV, 2024). Compared to Turkey and other European countries, this increase is quite limited. The rate of uninsured vehicles in Germany is quite low. The country's strong crackdown on uninsured vehicles is the main reason for this. Vehicles without insurance are automatically prevented from entering traffic because their insurance information is monitored online via the Zentralruf der Autoversicherer and Kraftfahrt-Bundesamt (KBA) databases. Thanks to this digital control system, the use of uninsured vehicles in Germany has fallen below 1%.

Table 2

German Compulsory Traffic Insurance Data for the Years 2019-2023

Years	Premium Income (Billion Euros)	Paid Claims (Billion Euros)	Loss Ratio %	Combined Ratio %
2020	16.9	13.3	79.4	91.8
2021	17	13.5	79.9	88.3
2022	16.9	14.9	88.4	96.5
2023	17.7	16.1	92.4	101.5
2024	19.5	17.2	88.2	100

Source: German Insurance Association (GDV), *Statistics on the German Insurance Industry 2024*, retrieved on January 5, 2025, from <https://www.gdv.de/gdv/statistik/statistiken-zur-deutschen-versicherungswirtschaft-uebersicht>.

Table 2 contains data on compulsory traffic insurance in Germany for the period 2020–2024. Premium income, which was €16.9 billion in 2020, rose to €19.5 billion in 2024. During the same period, loss ratios ranged between 79% and 92%, reaching their highest level in 2023. Nevertheless, the fact that combined ratios remained around 100% indicates that the German compulsory traffic insurance system generally exhibits a balanced financial structure.

6.2. Compulsory Traffic Insurance in France

The legal framework for compulsory traffic insurance in France is established by the second section of the French Insurance Code (Code des assurances) and the French Highway Code (Code de la route). Furthermore, the European Union's traffic insurance directives form the basis for these national regulations. In this context, compulsory traffic insurance in France also guarantees compensation for material and bodily damage caused to third parties in traffic accidents (Richaudeau, 1998, p. 433).

In France, compulsory traffic insurance premiums are determined by insurance companies based on individual risk factors such as the insured's age, occupation, and region of residence. In addition, a bonus-malus system is used in premium calculations in the country. A distinctive feature of the French system, unlike other European countries, is that it has a proportional structure rather than a tiered one. Accordingly, drivers receive a 5% discount for each accident-free year, while a 25% penalty is applied for each accident (Pitrebois, Denuit, & Lambert, 2006, p.248). France also has a Central Pricing Office (Bureau Central de Tarification [BTC]) that provides support to individuals who have difficulty obtaining insurance. The number of applications to this institution is increasing every year, with elderly and young drivers making up the majority of applicants. In 2024, the highest rate among the reasons for rejection by insurance companies was drivers with a history of frequent accidents, accounting for 35% (BTC, 2024).

Uninsured motorists are one of the main problems facing France's compulsory traffic insurance system. In 2023, the number of people killed in accidents involving uninsured vehicles was 160, an increase of approximately 1.9% compared to 2022. During the same period, the number of people injured or suffering material damage in accidents caused by uninsured vehicles was 7,687, a decrease of approximately 9.8% compared to 8,519 cases in 2022 (Fonds de Garantie des Assurances Obligatoires de dommages [FGAO], 2023). An analysis of data from the last five years shows that the number of accidents caused by uninsured vehicles has generally been on the rise. This indicates that the problem of uninsured vehicles remains a serious issue in France.

Looking at the combined ratios after reinsurance in France's compulsory traffic insurance sector, a generally stable trend has been observed over the past five years. The combined ratio, which was 94% in 2020, rose to 99.5% in 2021 and 100% in 2022, before falling back to 98% in 2023. These rates show that the sector generally exhibits a balanced financial structure and that, although profitability has declined to a limited extent in some years, the system has maintained its sustainability.

6.3. Compulsory Traffic Insurance in the Netherlands

The Netherlands was the last European country to implement compulsory traffic insurance, which came into effect in 1965. The compulsory traffic insurance system in the Netherlands is regulated by the Motor Vehicle Liability Insurance Act (Wet Aansprakelijkheidsverzekering traffic rijtuigen WAM) and the Road Traffic Act (Wegenverkeerswet), as well as by European Union directives (Walter, 1962, p.15). Pursuant to Article 3 of the aforementioned law, compulsory traffic insurance in the Netherlands covers material and bodily damage caused to third parties.

In the Netherlands, insurance companies are free to set premiums based on the characteristics of the driver and the vehicle, as well as the type of insurance. One of the most important factors in determining premiums is the age of the insured. Previously, insurance companies used the bonus-malus system to determine the initial class based on the driver's age and annual mileage. Today, however,

insurance companies use a central digital database called Roy Data. This database contains information such as the number of accidents the insured has had in the past or the number of years without a claim (Verbond van Verzekeraars, 2022). Insurance companies apply the bonus-malus system based on the data in the Roy Data system, and the operation of the system may vary from company to company.

The Waarborgfonds, known as the Guarantee Fund operating in the Netherlands, compensates for damages caused by uninsured or unidentified vehicles. According to the fund's data, compensation payments amounted to €68 million in 2022 and €79 million in 2023. Based on these figures, fund payments increased by approximately 16% in 2023. In 2022, 11% of these payments were allocated to damages caused by uninsured vehicles, and this percentage remained the same in 2023. This stability in payment rates indicates that the problem of uninsured vehicles in the Netherlands has not been completely eliminated but continues at a certain level (Waarborgfonds traffic verkeer, 2023). Previously, higher rates of uninsured vehicles in the Netherlands posed a significant problem for the country's traffic insurance system. However, the Rijkdienst voor het Wegverkeer (RDW) system was established in 2011 and has made significant progress in this area. RDW is a system that digitally collates the registration, license, and insurance information of all vehicles on the road throughout the country. This system automatically detects vehicles without insurance policies, and administrative fines are imposed on vehicle owners. As a result, the detection of uninsured vehicles in the Netherlands has accelerated, and the uninsured rate has decreased.

An analysis of the combined ratios for compulsory traffic insurance in the Netherlands over recent years indicates a decline in the sector's profitability. Between 2019 and 2022, combined ratios ranged between 108% and 111%, indicating a continuing trend of technical losses. In 2023, during a period of significantly increased losses in the sector, the ratio rose to 120%. These figures show that the compulsory traffic insurance sector in the Netherlands is operating at a loss (De Nederlandsche Bank, 2024).

6.4. Compulsory Traffic Insurance in Italy

Like other European countries, the legal framework for compulsory traffic insurance in Italy is based on European Union directives and the national insurance law, the "Codice delle Assicurazioni Private" (Private Insurance Code) No. 209 (Martinelli, 2016, p. 6). Article 122 of this law defines the scope of compulsory traffic vehicle insurance and stipulates that this insurance covers material and bodily harm caused to third parties.

In Italy, which has transitioned to a free tariff system to comply with European Union directives, insurance premiums are determined by insurance companies based on the risk characteristics of the insured and the vehicle. Italian insurance companies use a wide variety of methods to calculate premiums, one of which is the bonus-malus system, which is also used in other European countries. However, they also use a deductible, known as *franchigia*, whereby the insured agrees to pay a certain amount of the damage, which reduces the premium payable.

Additionally, Article 133 of the Private Insurance Act stipulates that insurance companies are obligated to provide mandatory premium discounts under certain circumstances. For example, a premium discount is applied if the insured vehicle is equipped with a "scatola nera" (black box) electronic device or passes a technical inspection upon request. This device records the vehicle's speed, braking, direction changes, and the impact force at the moment of an accident, enabling insurance companies to accurately assess the vehicle's driving behavior. Furthermore, if the vehicle is equipped with a system that measures alcohol levels and prevents the engine from starting when legal limits are exceeded, a premium discount is also applied to the driver. Such technological equipment enables insurance companies to price risks more fairly and accurately.

The rate of uninsured drivers in Italy has been around 6% in recent years. Although this rate is relatively low compared to other European countries, it has shown an upward trend in recent years.

The combined ratios for compulsory traffic insurance in 2022 and 2023 were 107.8% and 105.5%, respectively, indicating that insurance companies are technically operating at a loss. However, the revision of reserves set aside in previous years contributed to these ratios falling to 102.3% and 99.3%, respectively. This situation shows that, as of 2023, the reserves created in previous periods are sufficient to protect the financial balance of insurance companies (Associazione Nazionale fra le Imprese Assicuratrici [ANIA], 2024).

6.5. Compulsory Traffic Insurance in Poland

Poland is one of the most recent and developing countries to join the European Union. For this reason, it has adopted compulsory traffic insurance later than other European countries. The compulsory traffic insurance system in the country is regulated by European Union directives and the “Act on Compulsory Insurance, the Insurance Guarantee Fund, and the Polish Motor Insurers’ Bureau” (Ustawa o obowiązkowych ubezpieczeniach, Ubezpieczeniowym Funduszu Gwarancyjnym i Polskim Biurze Ubezpieczycieli Komunikacyjnych). The insurance coverage includes material and bodily harm caused to third parties.

In Poland, the premium determination system for compulsory traffic insurance is free. Insurance companies determine premiums in a two-stage process. In the first stage, criteria such as the driver’s age, occupation, region of residence, driving experience, and vehicle model are evaluated, taking into account the characteristics of the insured and the vehicle, and a priori tariffs are established accordingly. In the second stage, a posteriori pricing is applied based on the insured’s past claims history, i.e., the bonus-malus system comes into play (Szymańska, 2007, p.929). The number of classes and transition rules in the bonus-malus system vary depending on the insurance company. However, in general, the number of classes in the system ranges from 11 to 13. For example, the bonus-malus system applied by PZU, one of the largest insurance companies in Poland, consists of 11 classes, with a maximum premium discount of 60% and a premium increase of up to 200% applied in this system.

The percentage of uninsured vehicles in Poland is higher than in other European countries. According to data from the Polish Guarantee Fund, also known as the Ubezpieczeniowy Fundusz Gwarancyjny, 348,795 uninsured vehicle owners were identified in 2023, and a total of PLN 358.5 million was recovered from uninsured drivers through recourse in the same year (UFG, 2024). In terms of average premium amounts, Poland is one of the countries with the lowest premium levels among European countries. In 2023, the average premium amount for compulsory traffic insurance was approximately 117 euros.

Looking at the technical results for the period 2019–2023, it is evident that the compulsory traffic insurance sector in Poland has generally incurred losses. During the period under review, a profit of 13.6 million euros was achieved only in 2021. In all other years, the sector reported losses. In particular, the loss amounted to €76.8 million in 2019, and the highest loss for the period was recorded in 2022 at €86.8 million. In 2023, a loss of €78.6 million was also recorded. These findings show that technical profitability cannot be consistently achieved in the compulsory traffic insurance system in Poland. It shows that the pricing system fails to balance risks and that premium revenues are insufficient to cover claims costs.

7. Comparison of Compulsory Traffic Insurance Systems in Turkey and European Countries

After briefly explaining each country’s compulsory traffic insurance system, a comparative analysis of these systems was conducted. Table 3 presents a comparative overview of the compulsory traffic insurance systems in the countries examined, based on key criteria such as scope, coverage limits, uninsured rate, penalty amount for uninsured drivers, premium determination method, bonus-malus system, and the system’s financial balance.

Table 3
Data on Compulsory Traffic Insurance in European Countries and Turkey

	Turkey	Germany	France	Italy	Netherlands	Poland
Scope	Material	Material	Material	Material	Material	Material
	Personal	Personal	Personal	Personal	Personal	Personal
	Damage	Damage	Damage	Damage	Damage	Damage
Collateral Limits	300.000,00 TL	1.3 million €	1.3 million €	1.3 million €	1,3 million €	1.4 million €
	2.7 million TL	7.5 million €	Unlimited	6.4 million €	6,4 million €	6.4 million €
Uninsured Rate	%20	%1 under	%2,4	%6	%1.5	%18
Penalty for Lack of Insurance	992 TL Traffic Ban	Income- Based Traffic Offense Imprisonment	3750 € Public Work Traffic Ban	886-3464 € Traffic Ban	460-500 € Traffic Ban	2190 € Traffic Ban
Premium Determination	Maximum Premium	Free	Free	Free Discounts Exemption	Free	Free
Bonus-Malus	8 steps	SF system 54+step	Proportional system	18 step	Company- based 20-22 steps	Company- based 11-13 steps
System Balance	Loss	Balanced	Balanced	Loss	Loss	Loss

Source: *The author's own work. Prepared based on data obtained from institutional reports, official statistics, and academic publications pertaining to the insurance sectors of the relevant countries.*

According to the data in the table, the scope of compulsory traffic insurance is similar in all countries examined. The insurance covers material and bodily damage caused to third parties. In accordance with the EU Traffic Insurance Directives, the 2024 coverage limits have been set at quite high levels in European Union countries. Despite recent increases, Turkey's coverage limits remain relatively low compared to European countries.

The percentage of uninsured vehicles exists to some extent in every country, but in Europe, thanks to effective monitoring and digital tracking systems, these rates have been reduced to very low levels. For example, as of 2024, this rate is 6% in Italy, 1% in Germany, and higher in Poland due to its developing insurance market and new applications. In Turkey, the uninsured vehicle rate is around 20%, which remains a significant problem for the sector.

There are also significant differences between countries in the administrative penalties imposed on uninsured vehicles. In Turkey, individuals who drive uninsured vehicles are subject to an administrative fine of 992 TL and the vehicle is impounded. However, enforcement is generally limited to the fine. This violation faces much harsher penalties in European countries. For example, in France, driving an uninsured vehicle can result in a fine of up to €3,750 and community service, while in Poland the fine is approximately €2,190. In Germany, driving without insurance is considered a more serious offense and can sometimes result in penalties such as imprisonment.

In terms of premium determination systems, a free tariff system is applied in European Union countries, and insurance companies determine premiums based on the risk characteristics of the vehicle and the insured. In contrast, the maximum premium system continues to be applied in Turkey, and maximum premium rates are regulated by the state. The bonus-malus system is used in all countries,

but there are differences in how the system operates. While a step-by-step system is applied in most European countries, a proportional system is used in France.

Finally, when examining the system's financial balance, it is evident that the compulsory traffic insurance sector in Turkey exhibits a loss-making structure. Among European countries, Italy, the Netherlands, and Poland are technically prone to losses, but the German and French systems perform better financially. More advanced risk assessment models, higher premium levels, and stronger control systems in Europe increase the system's sustainability.

8. Conclusion and Evaluation

Research shows that compulsory traffic insurance systems in both Turkey and some European countries are financially unbalanced and prone to losses. However, these losses are managed in a more controlled manner in European countries, while in some countries the system is balanced or profitable. In Turkey, the system has been generating technical losses for many years, indicating that structural problems persist.

Various recommendations have been developed based on the findings obtained for Turkey. First, the rate of uninsured vehicles in Turkey is quite high (around 20%), and the current administrative fines are low and not deterrent. In European countries, however, penalties for uninsured vehicle use are applied in the form of both high fines and administrative sanctions, which helps reduce uninsured rates. Therefore, in Turkey too, penalties need to be increased, digital tracking mechanisms need to be strengthened, and sanctions need to be effectively enforced.

In terms of premium determination systems, European countries have a risk-based and multi-variable structure. Insurance companies determine premiums based on factors such as the driver's risk profile, the vehicle's technical specifications, age, occupation, place of residence, and claims history. In Turkey, however, there is no pricing freedom due to the maximum premium application, and risk differentiation is limited because the bonus-malus system consists of only eight levels. Creating a more multi-level and fair classification system, similar to that in Germany, would contribute to premiums reflecting the actual risk.

The "black box" (scatola nera) system implemented in Italy provides insurance companies with objective data by recording vehicles' speed, braking, steering, and driving behavior. The widespread adoption of similar digital applications in Turkey will both increase the accuracy of risk analysis and enable fair pricing. As in examples from European countries, it is also important to establish a new institutional structure or assign an existing institution (such as the Guarantee Account) to carry out projects in the areas of combating uninsured driving, public awareness, and traffic safety.

In conclusion, to enhance the effectiveness of Turkey's compulsory traffic insurance system and make it sustainable, risk-based pricing, the development of digital monitoring tools, the implementation of deterrent sanctions, and the widespread promotion of activities that strengthen insurance awareness are necessary. Steps taken in this direction will significantly increase both the financial sustainability and social effectiveness of the system.

AUTHOR STATEMENT

Research and Publication Ethics Statement

This study has been prepared in accordance with scientific research and publication ethics rules.

Ethics Committee Approval

This study did not use data collection techniques requiring ethics committee approval.

Author Contributions

The authors contributed equally to the work.

Conflict of Interest

There is no conflict of interest arising from the work from the perspective of the authors or third

parties.

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